

Suspended Cell Culture ANALysis (SCAN) Tool to Enhance ISS On-Orbit Capabilities, Phase I

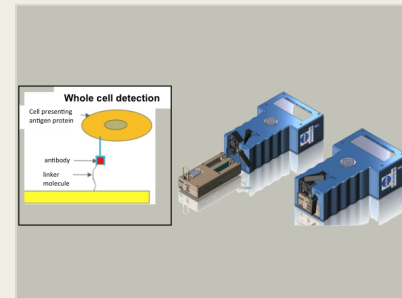
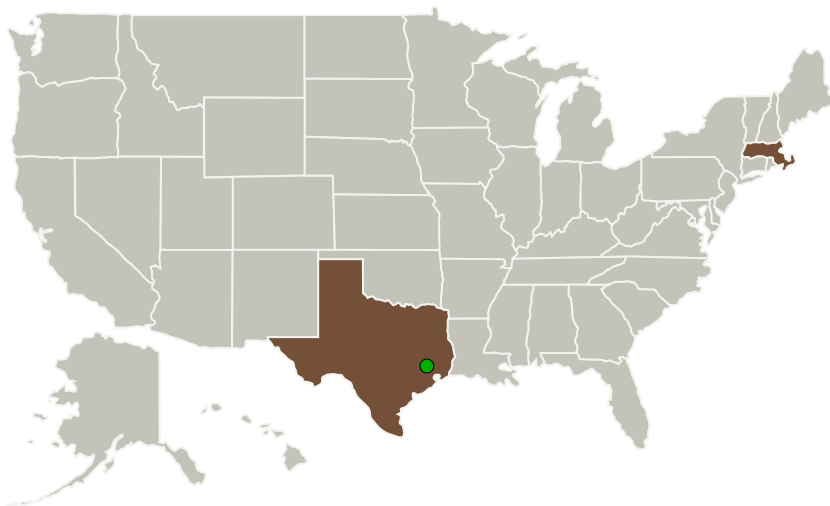
Completed Technology Project (2014 - 2014)



Project Introduction

Aurora Flight Sciences and partner, Draper Laboratory, propose to develop an on-orbit immuno-based label-free Suspension Cell Culture ANALysis tool, SCAN tool, which utilizes antibody-antigen surface binding as its core sensor technology. Our proposed SCAN tool is designed to provide an on-orbit analysis of suspension samples to support studies of bone and muscle loss, multi-generational species studies and cell and plant tissue per NASA SBIR topic description H.10.02. The SCAN tool technology would function as follows: A disposable cartridge specific to a targeted biomarker is inserted into the SCAN tool. The user introduces a cell suspension sample into the cartridge. Cells presenting target antigens bind specifically to corresponding antibodies fixed within the cartridge flow path. The number of bound cells is detected optically by the SCAN tool and is reported to the user on a display screen within several minutes. The cartridge is removed, disposed and replaced after each measurement. We propose to heavily leverage our experience gained from the On-Orbit Immuno-Based Label-Free White Blood Cell Counting System with MEMS Technology (OILWBCS-MEMS) Phase I and Phase II SBIR contracts (completed August 2012) for this effort. The OILWBCS-MEMS benchtop evaluation setup will be used as a test platform, and the hand held SCAN tool design will use OILWBCS-MEMS as a point of departure. The major difference between the two is the surface chemistry required to target the biomarkers of interest. By building upon a successful project, we continue to make use of NASA's considerable prior investment. Our prior effort also enables us to quickly mature this technology to high TRL (proposed TRL 6-7) by the end of Phase II.

Primary U.S. Work Locations and Key Partners



Suspended Cell Culture ANALysis (SCAN) Tool to Enhance ISS On-Orbit Capabilities Project Image

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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
● Johnson Space Center(JSC)	Supporting Organization	NASA Center	Houston, Texas

Primary U.S. Work Locations	
Massachusetts	Texas

Project Transitions

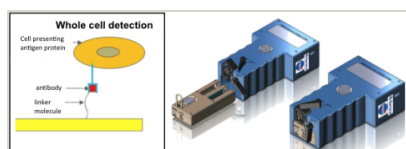
▶ **June 2014:** Project Start

✔ **December 2014:** Closed out

Closeout Documentation:

- Final Summary Chart(<https://techport.nasa.gov/file/138582>)

Images

**Project Image**

Suspended Cell Culture ANALysis (SCAN) Tool to Enhance ISS On-Orbit Capabilities Project Image (<https://techport.nasa.gov/image/131419>)

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

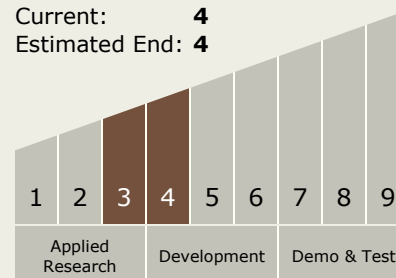
Jessica Duda

Co-Investigator:

Jessica Duda

Technology Maturity (TRL)

Start: **3**
 Current: **4**
 Estimated End: **4**



Technology Areas

Primary:

- TX06 Human Health, Life Support, and Habitation Systems
 - TX06.3 Human Health and Performance
 - TX06.3.1 Medical Diagnosis and Prognosis

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Target Destinations

The Sun, Earth, The Moon,
Mars, Others Inside the Solar
System, Outside the Solar
System